



**EU Pacific Water Governance Project
Kiribati Pilot Study**



**LONG TERM WATER AND SANITATION
PRIORITIES IN KIRIBATI FOR POTENTIAL
SUPPORT UNDER EU EDF10**

DRAFT

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Summary

During the course of the Kiribati case study under the EU Pacific Water Governance Project, a number of strategic priority issues have been identified in which donor investment has the potential to have longer term benefits. These projects are briefly described in this document. All are directed at the UN's Millennium Declaration Goal *“to halve by the year 2015 the proportion of the world's population who are unable to reach or afford safe drinking water”* and *“to stop the unsustainable exploitation of water resources”*. Infant mortality rates in Kiribati, due to water-borne diseases are amongst the highest in the Pacific.

The first project provides a resource officer to support the National Water and Sanitation Coordination Committee. This Committee is intended to provide an integrated whole-of-government and government-community partnership approach to management and planning of the water and sanitation sector management in Kiribati. It is shown that the issues faced in Kiribati in this sector are amongst the most critical in the world. Previous reports have identified that the lack of a coordinated approach involving all relevant government agencies and community organisations developing a long term strategies is hampering progress in the water and sanitation sector. The appointment for 10 years of a resource officer within the Strategic National Policy and Risk Assessment Unit in the Office of the President to assist the National Committee will provide the required strategic approach. It is also suggested that a mentoring team be appointed to provide encouragement and support for the resource officer. The estimated cost of this project is 360K€ over 10 years.

The second project is the first 5-year phase of a four phase, 20 year Outer Island Water Supply Project. This is intended to increase the amenity and attractiveness of Outer Islands in order to lower the inward migration rate to urban centres. Priorities for Outer Island water supply systems have already been determined under an ADB project. In this project the highest priority islands, Nonouti, Abemama, Banaba, Abaiang, Tabuaeran (Fanning) and Kuria. This project will build on assessments undertaken under the KAPII project. Solar powered groundwater pumping, storage and distribution systems will be installed in selected islands and rainwater collection and storage systems will also be installed. In the Island of Banaba the dilapidated but sophisticated rainwater collection systems will be refurbished as a high priority. This project will include the enhancement of community participation in the management and protection of the freshwater sources and will include a scheme for making the maintenance and replacement of the scheme financially sustainable. The primary outcome intended is the reduction of the infant mortality rate due to water-borne diseases. The cost of the first 5 year phase of this project is estimated to be 5M€.

The third project addresses the urgent needs of urban South Tarawa where demand for safe reticulated water is probably already equal to the sustainable extraction rate from current groundwater sources. The rate of exponential increase in population there has been about 4% since 1963 due to both natural growth and inward migration. The incidence of diarrhoea and dysentery there is disproportionately high particularly in densely populated areas. Refurbishment of the South Tarawa reticulated treated freshwater system under the ADB SAPHE project was completed in December 2005. The SAPHE project concentrated mainly on improving the bulk water supply component of the water supply system. It did not address the nearly 50% leakages that occur in the urban distribution systems to households and it provided improved connections to only 41% of households. This project aims to increase the number of households with improved connections to 80%, to decrease leakage to 25% and to install water meters to initiate charging for consumed water. This project is estimated to cost 1.3M€.

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1. Support for the National Water and Sanitation Coordination Committee

1.1 Introduction

Water is a vital, strategic environmental resource that underpins human well-being, health, cultural and spiritual values, and provides development opportunities. The nature of coral islands and atolls, demographic trends, climatic variation and change and the impacts of human activities all combine to impose significant risks to water supplies and the environment for island communities and their environments. The challenges faced in the water and sanitation sector in low small island states are amongst the most difficult in the world particularly when the threats of climate change are considered. Good water governance is necessary for achieving sustainable, economic, social and environmental outcomes and developing adaptation strategies. It includes participation, accountability, inclusiveness, transparency, responsiveness and the supply and use of appropriate information. One strategy for improving water governance is to enhance coordination between government agencies with responsibilities in water and to foster community partnerships with government in the conservation, management and use of water and sanitation services.

The *Pacific Regional Action Plan on Sustainable Water Management*, endorsed by all Pacific Island Nations Heads of State during the Pacific Island Leaders meeting in Auckland in 2003, and presented at the 3rdWWF, called for broadly-based national water visions, design of capable institutions, national water action agenda and plans, empowerment of communities, and integrated investment plans. It recognised that both behavioural change and improved collaboration were essential for improvement. Behavioural change and improved collaboration are long term tasks.

1.2 The Challenges in the Republic of Kiribati

Numerous Government of Kiribati (GOK) supported projects have emphasised the major and continuing challenges in ensuring that island communities have access to safe and adequate freshwater and opportunities for economic development. Mortality rates for children under the age of 5 years in Kiribati due to diarrhoeal diseases are amongst the highest in Pacific Island Nations (Table 1.1). This has a strong relation to hygiene and fresh water.

These vital challenges involve sometimes island-specific, health, technical, economic, social and cultural issues that are interrelated and cut across traditional sectoral administrative divisions. In some islands the availability of freshwater still remains to be assessed. The GOK decided in 1985 that a strategic, whole-of-government approach involving all sectors with responsibilities and interests in water was required to address critical problems in the water and sanitation sector. The *Kiribati Water Supply and Sanitation Coordinating Committee* (KWSSCC) was established to monitor water quality

in the country, to review and consider future water and sanitation projects before presentation to Cabinet, and to act as an advisory body to Government Ministries and non-Government organizations on water and sanitation related matters.

Table 1.1. Mortality rates in 2005 for children under the age of 5 years in Pacific and selected countries (Source Country Health Information Profiles, 2005-WHO).

Country	Infant mortality rate (/1000)	Infant mortality rate caused by diarrhoeal diseases (/1000)
Kiribati	49	10.7
Papua New Guinea	67	10.3
Marshall Islands	52	7.3
Fiji	16	1.7
Tonga	21	2.1
Samoa	25	2.4
Solomon Islands	34	3.0
Federated States of Micronesia	19	1.5
Malaysia	10	0.54
United States	6	0.006
Australia	3	0.003

1.3 National Coordination of the Water and Sanitation Sector

The very high incidence of diarrhoeal diseases, particularly amongst young children led to the KWSSCC advising the GOK to request Australian assistance in upgrading the sanitation and water supply systems on South Tarawa. The Australian International Development Assistance Bureau's (AIDAB) Pacific Regional Team conducted a field appraisal of the proposal in 1993 and concluded that the problem in South Tarawa was critical. It recommended a comprehensive, multi-disciplinary, coordinated, long term (at least 10 years) program with multiple components being conducted in parallel rather than by implementing individual components and with annual budgets of several million (1993) dollars.

The main issues identified were water supply systems, sewerage systems, sewerage disposal in non-sewered areas, solid waste disposal and population aspects including population density, resettlement and education programs. The Team recommended that community health, education, water supply, sanitation, appropriate technology, institutional strengthening, management, policy and strategy development needed to be considered in a coordinated approach. That recommendation was not acted on and instead a series of projects have attempted to address critical urban and rural or outer island issues with specially appointed steering committees.

The Kiribati Water Supply and Sanitation Coordinating Committee has been defunct for some time. Some of the issues cited for its demise are loss of initial enthusiasm after project initiation; disputes over what Government Ministry should be the lead Ministry, a traditional reluctance to share knowledge, and a lack of clear definitions of responsibilities

and terms of reference. The project-specific steering committees that have been formed instead these lack continuity and strategic direction and are driven by the goals of the project rather than national priorities.

In an effort to improve coordination, the Kiribati Water Sector Road Map, developed under the Asian Development Bank (ADB) Technical Assistance Project *Promotion of Effective Water Management Policies and Practices* ranked a number of strategic actions for outer island water supplies and sanitation. Under the institutional and policy area this 20-year Road Map proposed as highest priority the development of national water policy whilst the establishment of a National Water and Sanitation Committee (or a number of committees) to advise the Government on all aspects of water supply and sanitation for all of Kiribati ranked second in priority in this area. Some of the functions envisaged for this committee were providing a forum for the community and NGOs to express their opinions; to review performance of the supply and sanitation systems across the nation and to review the performance of groundwater protection measures.

The most recently completed water and sanitation project in Kiribati was the ADB Sanitation, Public Health and Environment Improvement (SAPHE) project. The GOK Completion Report on the ADB SAPHE Project in March 2006 reviewed the benefits and lessons of SAPHE. It concluded that: *“There is still quite a lot of overlap in the regulatory duties of the different government departments, especially in the area of water, and there have been several instances where the departments could not agree to one common solution over the development of additional water resources. There is need for these departments to sit together and draw a proper line on their scope of duties.”*

The institutional responsibilities in the water and sanitation sector in Kiribati are shown in Fig. 1.1.

1.4 The EU Pacific Water Governance, Kiribati Pilot Study

The European Union (EU) has established a Programme for Water Governance (PfWG), for three regions, Africa, the Caribbean and the Pacific. The South Pacific Applied Geoscience Commission (SOPAC) proposed three pilot studies in the Pacific in Fiji Islands, Kiribati, and the Solomon Islands for water governance at different scales: national, major utility and local village, island or catchment based.

The overall goal of the PfWG is:

“to mainstream the principles of good water governance into day to day applications and pilot projects so as to assist in achieving sustainable water resource management and provision of water services”.

A key element in the Kiribati is the re-establishment of National Water and Sanitation Coordination (NWSCC). Discussions with government agencies and NGO's has resulted in a daft terms of reference for the NWSCC. The draft mission of the Committee is:

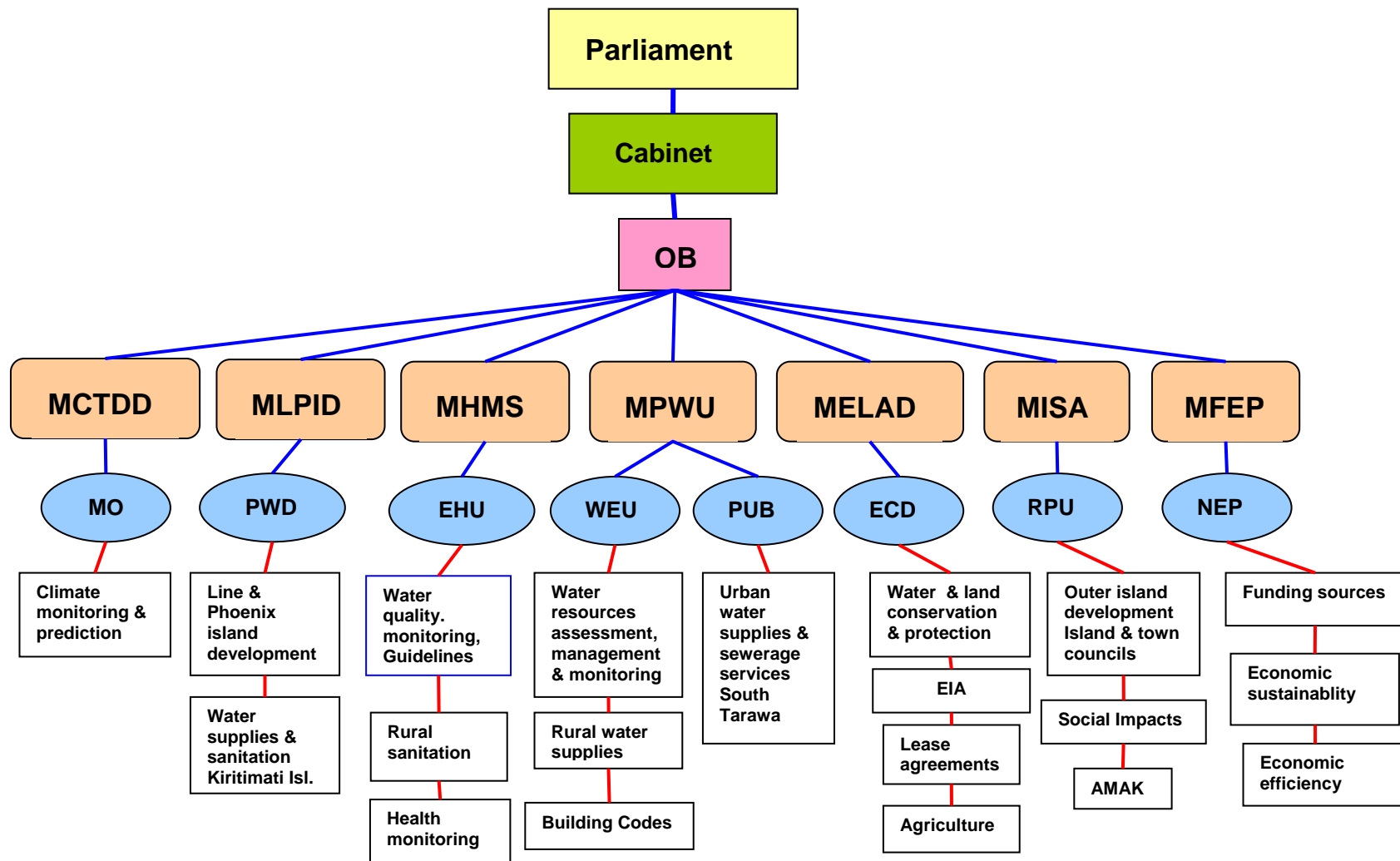


Fig. 1.1 Kiribati Water Sector Organisational & Responsibility Diagram

To coordinate, facilitate and enhance Government and community activities in the water and sanitation sector to ensure that communities have access to water of suitable quality and appropriate quantities and to appropriate sanitation to meet all reasonable health, environmental, and development needs.

The suggested principle aims of the Committee are to:

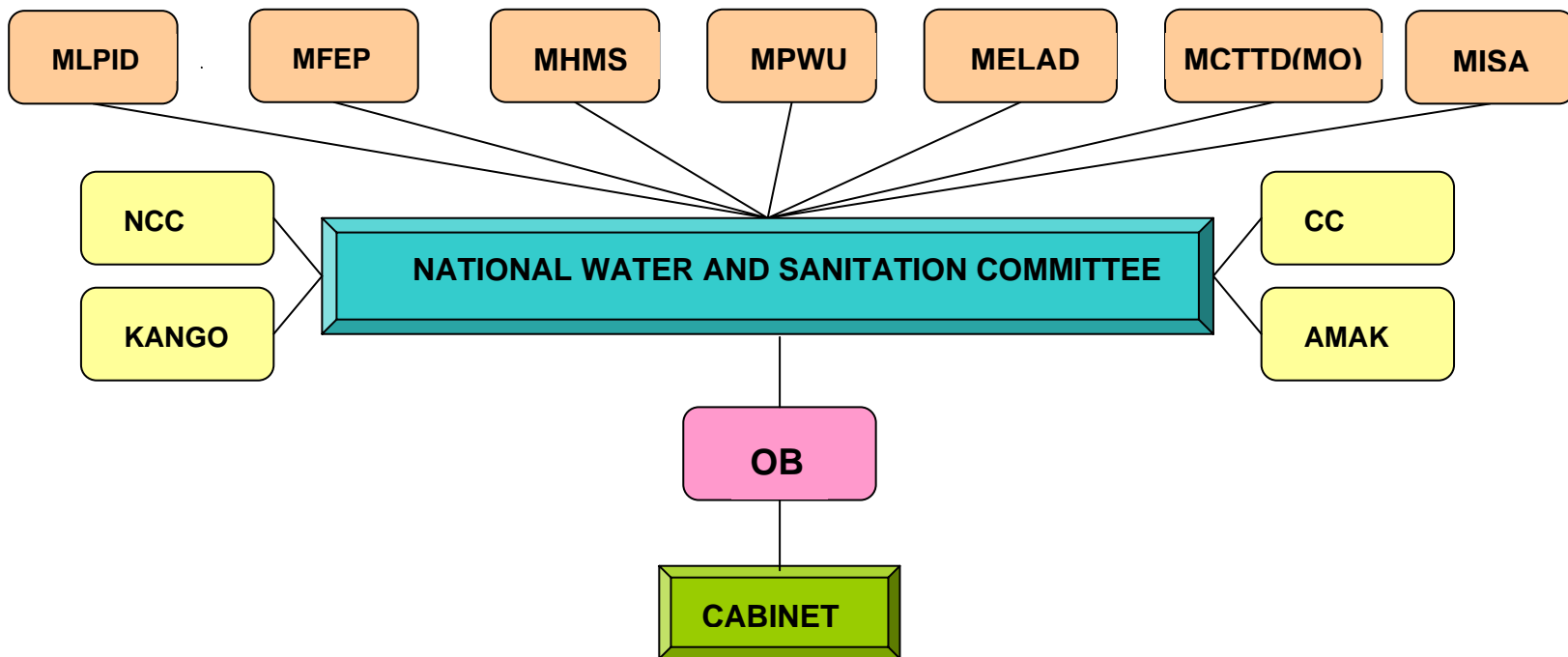
1. *Promote the sustainable management, conservation and use of water and related land resources by coordinating and enhancing Government and community activities and involvement.*
2. *Facilitate and enhance initiatives to raise the quality of life by improving the quality and availability of safe water and decreasing illness and infant mortality rates due to water-borne diseases.*
3. *Coordinate and facilitate information gathering and assessment, policy and instrument development, and identification of other needs for the water and sanitation sector throughout Kiribati.*
4. *Provide broadly-based strategic advice to the Government of Kiribati, the community, non-government and donor organisations on the nation's water resources and sanitation service and their management and use.*

It is suggested that the Committee will:

1. Coordinate and enhance the strategic activities of Government Ministries in the water and sanitation sector to ensure sustainable management.
2. Facilitate and coordinate the review and assessment of water and sanitation-related policies, regulations, plans, instruments and standards and make recommendations to Government on policy development, program implementation and potential improvements.
3. Provide the Government with broadly-based, coordinated, strategic advice on priorities for water and sanitation and on water-related development opportunities.
4. Provide a national forum for the discussion of water and sanitation-related issues.
5. Coordinate and facilitate an annual, national, island-based assessment report on the quality and quantity of water resources, water consumption, rainwater harvesting and demand for water and encourage strategic systematic monitoring.
6. Coordinate and facilitate assessments of risks in the water and sanitation sector and possible adaptation strategies in relation to global change and extreme events.
7. Enhance and coordinate strategies to improve community understanding of and participation in water and sanitation use and planning and in furthering water conservation and protection.
8. Coordinate the review and assessment of, and make recommendations on proposals for water and sanitation-related projects.

The Committee will provide the medium for integrated policy development and program implementation and for coordination and enhancement of information gathering, analysis and clearing; and dialogue and consultation on matters of policy and regulations content for the nationally vitally important water and sanitation sector. In order to lessen the institutional frictions it has been proposed that the Committee be coordinated by the Office of the President (OB) and includes NGO's. The organisation chart is in Fig. 1.2.

Fig. 1.2 Proposed Structure for the National Water and Sanitation Coordination Committee



The Road Map for the Water Sector for Kiribati envisaged that reform in the water and sanitation sector was a 20-year programme, which required a coordinated trans-sectoral approach. A critical element in the EU project strategy is the provision of long term coordination of the National Water and Sanitation Coordination Committee by the Office of the President. Because of resource limitations there is little chance that this coordination can be adequately resourced. For this reason it is proposed that part of the EU EDF10 commitment to Kiribati to allocated to strategically supporting an I-Kiribati resource officer for the NWSCC. The *Pacific Regional Action Plan on Sustainable Water Management* recognised that behavioural change was necessary in the water and sanitation sector. Behavioural change requires a long term process and for this region it is suggested that the position be supported for a period of 10 years.

1.5 Proposed Water Governance Project Brief for Support under the EU EDF10.

Project Title: Resource Officer for the Kiribati National Water and Sanitation Coordination Committee.

Objective: To assist development of a whole-of-government and government-community partnership approach for addressing and adapting to the critical issues in the water and sanitation sector by resourcing and coordinating the activities of the National Water and Sanitation Coordination Committee.

Tasks: Resource Officer will assist the National Water and Sanitation Committee to:

1. Improve the safety of freshwater supplied from groundwater and rainwater systems.
2. Protect fresh groundwater resources from adverse human impacts.
3. Sustainably manage all aspects of the use and conservation of freshwater.
4. Improve knowledge of the quality and quantity of the nation's freshwater resources and demand for them.
5. Improve knowledge and management of water resources under climatic extremes and change.
6. Improve outer island water supplies
7. Increase community awareness and understanding of water resource and sanitation issues
8. Increase community participation in water resource and sanitation management.
9. Increase the use of rainwater harvesting.
10. Develop instruments to help manage demand and allocation of water.
11. Review and revise, where necessary, all legislation, regulations and organisational responsibilities relevant to water and sanitation.
12. Ensure cost effective planning, operation and maintenance of water supply and sanitation systems.

Anticipated Outcomes:

The anticipated outcomes from this appointment are:

- Improved public health due to a decrease in water-borne diseases;
- Equitable access to safe freshwater;
- Sustainable water supply systems;
- Protection of freshwater resources from adverse impacts of human activities;
- Better knowledge of the quantity and quality of fresh water resources;
- Efficient allocation of water to various users;
- Improved risk assessment and management for the water sector;

- Greater public awareness of water resources issues;
- Enhanced water and sanitation educational programs;
- Increased stakeholder involvement in water protection of freshwater sources;
- Increased community participation in the conservation and management of water and water sources
- More effective governance, monitoring and assessment of water resources;
- Increased ability to respond quickly to water crises;
- Strengthened institutional capacity and training in the water sector;
- Clear identification of roles and responsibilities;
- Improved levels of cost recovery;
- Improved access to donor and loan schemes.

Period of Appointment: 10 years with a possible extension for another 10 years.

Level of Position: Deputy Assistant Secretary

Institutional Home: Strategic National Policy and Risk assessment Unit, Office of the President (OB)

Line Manager: Permanent Secretary (OB)

Mentoring of Position: In order to support this position it is recommended that a mentoring committee of water specialists with experience in the Pacific be set up under the chairmanship of SOPAC. This committee will to provide encouragement and advice on developing the whole-of-government and community partnership approaches.

Reporting Period: annual

Review Period: 3 years

Estimated Cost of the Position for 10 years and Mentoring Support: 330K €

2. Supporting Outer Island and Rural Communities in Kiribati: Safe Water Supplies for Rural Areas and Outer Islands

2.1 Introduction

The Republic of Kiribati consists of 32 low lying coral islands and 1 raised coral island in 3 main island groups scattered over three million square kilometres of sea in the Central Pacific, between 4° N and 3° S, and 172° E to 157° W. The total land area is 810.8 square km. There are 17 islands in the Gilbert Group containing the capital of the Republic, Tarawa atoll. South Tarawa is highly urbanised and has 43.5% of the nation's population. Population densities there are as high as 15,000 people/ square km with growth rates as high as 4.0% due to natural increase and inward migration.

There are 8 largely uninhabited islands in the Phoenix Group, located some 1750 km east of Tarawa. The only inhabited island of the Phoenix group is Kanton (Canton) Island. The Line Group has 8 islands, extending over a north-south line 2,100 km long, located at a distance of between 3,280 and 4,210 km east of Tarawa, and beginning 800 km south of Hawaii. This Group includes the largest island in Kiribati, Kiritimati Island, a designated growth centre, with an area of 388.4 square km. The population in Outer Islands is clustered into 169 villages on islands and islets throughout the island chains. Currently 12 atolls in the Line and Phoenix Groups are unoccupied.

Most of the islands are usually not more than 2 km wide, and, except for the raised island of Banaba, are not more than 6 m above sea level. The climate is tropical. Rainfall varies between the islands and is highly variable from year to year. The records are still too short to detect any trend due to climate change. Long droughts of up to 16 months, highly correlated with La Niña events, are relatively common with an average frequency of 6 to 7 years. The average yearly rainfall in the Gilberts ranges from 1,300 mm in the south near the equator to 2,000 mm on Tarawa, and over 3,200 mm in the northernmost islands while it is less than 900 mm in Kiritimati in the Line Islands.

Four locations Beru, Butaritari, Tabiteuea North in the Gilberts and Kiritimati island in Line Islands group have been chosen as Growth Centres in the latest National Development strategy. While surveys of the water resources of South Tarawa and Kiritimati has been completed those of other outer islands and rural areas in Tarawa are poorly known.

Creating environments that encourage people to remain in rural areas and outer islands continues a major challenge. The geographic distribution of communities imposes significant problems for the delivery of water and sanitation services across widely dispersed and isolated communities, with mostly limited land areas (except Kiritimati), limited water, restricted resources, increasing populations, with significant climate variability and enhanced vulnerability to climate change. This project is designed to

provide people in rural areas and Outer Islands with safe water supplies in order to decrease health risks and encourage communities to remain in these areas.

2.2 Problems of Water in Rural Areas and Outer Islands

2.2.1 Water and human health

Mortality rates for children under the age of 5 years in Kiribati are amongst the highest in Pacific Island Nations (Table 1. 1). A large percentage of these are due to hygiene and water-borne diseases. The highly permeable coral sands of atolls mean that surface runoff is almost non-existent in Kiribati and there are no surface streams. This high permeability means that surface contaminants are quickly transported into groundwater. Because of the absence of surface water there are two main sources of water in the country, groundwater and rainwater.

2.2.2 Domestic and community groundwater wells

Open hand-dug wells are the traditional method used by the I-Kiribati to obtain freshwater for their basic needs from shallow groundwater lenses. Because they are open, the water is exposed to contamination. Villagers also tend to dig these wells close to their dwellings, and pigs and other domestic animals. The introduction of pit latrines, in numerous villages and the keeping of domestic animals particularly pigs close to dwellings poses significant risks for drinking water from shallow hand-dug domestic wells. These domestic wells are a major source of water in both urban and rural areas.

In order to decrease contamination from surface sources improvements have been introduced in the construction of dug wells. Walls are supported by concrete rings, that are placed up to about half a metre above ground level, a concrete apron is cast around the well to impede the seepage of mud from the surface into the water, and a concrete cover is placed over the well, with an opening for drawing water out with a bucket. In some they are completely covered and a simple but almost fool-proof Tamana pump is used to draw water. This type of well is intended to serve five households and it has been estimated that there are about 1600 of them in the country. A major impediment with these wells is that they are usually still located close to dwellings and pit latrines.

Safer outer island water supply systems were developed during the UNDP/UBCDF Outer Islands Community Water Supply Project (OICWSP) which was implemented in the 1990s. Under the OICWSP, new wells or galleries were constructed at some distance away from villages and away from pit latrines and animals. Wells and galleries were fitted with either hand or solar pumps to deliver water to tanks and standpipes in villages via polythene pipes. Islanders have expressed a preference for solar pumped systems. The primary objective of the OICWSP was to provide safe potable water with a supply rate of 30 L/p/d to the inhabitants of approximately 100 villages on 13 islands in the Gilbert Group. Due to a combination of some design problems, equipment failure a failure to appropriately train local staff, lack of maintenance and other factors, most of these systems are now not operating and villagers have reverted to open wells close to dwellings.

2.2.3 Rainwater harvesting

The westernmost island of the nation, Banaba, alone relies almost totally on the collection of rainfall for its water supply. There, however, the sophisticated rainfall collection and storage scheme installed in the 1960's under the British Phosphate Commission is in urgent need of restoration (see Fig. 2.1). Rainfall collection has been used in Kiribati for many years, but it is regarded at best as a supplementary source of water except in islands where the groundwater becomes too brackish during droughts such as the islet of Kiebu in Makin Atoll or Nonouti Atoll. The potential for increasing rainwater harvesting is large and the enactment of building regulations obliging house owners to construct gutters and tanks for the harvesting of rainwater is recognition of its importance.



Fig. 2.1 Ferrocement rainwater collection tank in Banaba. The absence of a roof means that water is exposed to sunlight and organic debris such as leaves. Algal blooms result and the water is unused (Photo Moiuva, WEU, MPWU).

There are several reasons why rainwater is underused. Firstly, the cost of rainwater collection and storage is beyond many particularly in outer islands, so that building regulations are largely ignored. Secondly, there is a cultural preference for the taste of groundwater. Thirdly many of the roofs of buildings using traditional materials such as pandanus thatch are less than ideal for rainwater harvesting. Fourthly, many conventional sized affordable rainwater tank systems would fail during the frequent droughts. Fifthly people do not realise the risks in drinking untreated groundwater.

2.2.4 Desalination

Public reverse osmosis desalination plants capable of producing up to 100 m³/day have been installed in South Tarawa and Banaba. Only that on Banaba is currently partially operational. Problems with maintenance, the expense of spare parts and the costs of supplying power limit the longevity of desalination in many Pacific Island nations. In general the most appropriate systems are those that have the lowest risk of failure.

2.3 Prioritising Water Supply in Rural Areas and Outer Islands

The ADB Technical Assistance Project *Promotion of Effective Water Management Policies and Practices* developed a 20 year Kiribati Water Sector Road Map that set out strategies and a long-term action programme for outer islands. Strategies were identified under four key areas: water resource assessment and monitoring; community assessment, consultation and participation; institutional arrangements and policy framework; and water and sanitation development and arrangement. As part of the study, the water needs of Outer islands were prioritised in a workshop involving key stakeholders. Prioritisation considered: water related health issues; water supply facilities; adequacy of water resources; population growth rates; island cooperativeness; institutional capacity; ability of islands to finance systems or their maintenance; and water resources protection. The overall ranking of Outer Islands that resulted is summarised in Table 2.1.

Table 2.1. Ranking of Outer Islands for improvements to water supplies

Outer Islands	Final Rank
Nonouti	1
Abemama	2
Banaba	2
Abaiang	4
Tabuaeran (Fanning)	5
Kuria	6
Onotoa	7
Teraina (Washington)	8
Tabiteua South	9
Aranuka	10
Marakei	11
Nikunau	12
Maiana	13
Makin	14
Tamana	14
Arorae	16
Kanton (Canton)	17
Beru	
Butaritari	
Kiritimati (Christmas)	
Tabiteuea North	

The designated growth centres of Beru, Butaritari, Kiritimati and Tabiteuea North were excluded from the ranking since these were considered a government high priority. After discussions with the Water Engineering Unit, MPWU, it was decided that the highest priority should be given to villages that rely totally or almost totally on rainwater for drinking water as these are the most vulnerable during droughts.

Project costs have been prepared by the Water Engineering Unit (WEU) of the Public Ministry of Works and Utilities. The ADB project envisaged that the prioritised projects should be undertaken as a 15 year project with 4 five year stages each costing 5M€.

2.4 Relation to KAPII

As part of Kiribati Adaptation Project Phase II, groundwater and rainwater resource assessments will be undertaken for 5 to 10 selected villages on outer islands. It is intended that the results of these assessments will be used as the basis for implementing water supply improvements. The main focus of this Technical Assistance activity is to provide advice and guidance based on past experience in Kiribati and experience with similar systems in other coral atoll islands in other Pacific Island Countries on water supply improvements at selected villages in the outer islands.

For the raised island of Banaba, which relies heavily on rainwater, the water needs have already been assessed SOPAC and the WEU with costs estimated at 360k €.

2.5 Government Policy on the Sustainability of Outer Island Water Supplies

In 2004 the Cabinet of the Government of Kiribati announced a policy decisions to make Outer Island water supplies sustainable. In response to this the Ministry of Public Works and Utilities has proposed a scheme for charging village communities a small monthly rental for water supplies in order to cover the maintenance and replacement costs of the water supply systems.

The proposed project is consistent with this policy, with regional priorities and with UN Millennium Development Goals for freshwater.

2.6 Proposed Outer Islands Water Supply Project Brief for Funding under EDF10

Project Title: Provision of Safe Freshwater Supplies for Outer Islands. Phase I.

Objective: To provide safe and adequate water supplies for the priority outer islands of Banaba, Nonouti, Kiebu in Makin, Abemama, Abaiang, Tabuaeran (Fanning) and Kuria.

Tasks: This project will:

1. Liaise with the KAPII technical expert on water resource assessment for the priority islands and identification of safe sources of freshwater.
2. Prepare a project plan for the refurbishment of the rainwater catchment and storage system for the island of Banaba.
3. With Banaba Island Council establish an Island water management committee.
4. With Banaba water management committee and Island Council, develop strategies for ensuring community ownership, management and maintenance of community rainwater collection systems
5. Implement the refurbishment of the rainwater catchments on Banaba. Sustainably manage all aspects of the use and conservation of freshwater.
6. Conduct assessment of water sources, water quality and sustainable extraction rates in Stage I priority Outer Islands
7. Prepare plans for solar pumping, storage and distribution of fresh groundwater in the priority Outer Islands.
8. With island councils and community groups develop village water committees to oversee the equitable use, operation and maintenance of community water supply systems.
9. With island councils and community groups develop a charging regime that ensures the financial sustainability of maintenance and replacement of water infrastructure.
10. Install groundwater extraction systems where necessary, solar pumps and storage systems on selected priority Outer Islands.
11. Prepare plans for enhanced rainwater harvesting in priority outer islands.
12. With island water management committees and Island Councils, develop strategies for ensuring community ownership, management and maintenance of community rainwater collection systems
13. Install communal rainwater harvesting in priority outer islands.
14. With island councils and community groups develop education programs and regulations to protect water sources from contamination.
15. Provide training on the operation and maintenance of Outer Island Water Supply systems
16. Develop an educational program for primary school students in Outer Islands on the protection and use of water supply systems.

Anticipated Outcomes:

The anticipated outcomes from this project are:

- Improved public health on priority Outer Islands due to a decrease in water-borne diseases;
- Equitable access to safe freshwater in Outer Islands;
- Sustainable water supply systems;
- Protection of Outer Island freshwater resources from adverse impacts of human activities;
- Improvement in the amenity and attractiveness of Outer Islands.
- Better knowledge of the quantity and quality of fresh water resources in Outer Islands;
- Greater village-level awareness of water resources issues;
- Increased community involvement in water protection of freshwater sources;
- Increased community participation in the conservation and management of water and water sources;
- Financially sustainable Outer Island water supply systems
- Strengthened training in Outer Island water supply systems and management;

Period of Project: 5 years with a possible extension for another 3 phases of 5 years each.

Institutional Home: Water Engineering Unit, Ministry of Public Works and Utilities and Rural Planning Unit, Ministry of Internal and Social Affairs.

Oversight of Project: National Water and Sanitation Coordination Committee

Reporting Period: Annual

Review Period: 3 years

Estimated Cost of the Phase I Project for 5 years: 5.0M €

3. Supporting Urban Areas in Kiribati: Improving Access to Safe Water Supplies in South Tarawa

3.1 Introduction

In Kiribati, only communities in urban South Tarawa and Kirimati have access to reliable treated, reticulated water supplies. Even there, not all communities are served by reticulated water supplies. In South Tarawa, about 61% of households have some connections to reticulated water (Table 3.1), although less than 43% have access to upgraded connections. The low level taps and open-ended pipes are problematic, water water and can introduce contamination into the water supply system. Even for those with connections, water supply is often supplemented by frequently contaminated domestic well water.

Table 3.1 Households with connections to the reticulated water system in South Tarawa

Item	No. of Households
Total number of households in South Tarawa from 2005 census (excluding Buota)	5238
Households connected to reticulation system	3,224
Households with new SAPHE connections	2229
Households with low level taps	178
Households with open-ended pipes	817

Water demands in South Tarawa continue to escalate as population increases due to the natural rate and inward migration as shown in Fig. 3.1. Since 1963 the average exponential growth rate of the total population of Kiribati has been 1.8% while that of Outer Islands has been 0.9% and that of South Tarawa is 4%. Coupled to the increase in population is a growth in the use of water-dependent devices such as washing machines.

If these trends continue, the population of South Tarawa is likely to have well over 60,000 people by 2020. If a low estimate of consumption rate of 50 L/person/day of reticulated water is assumed for South Tarawa then the demand of the current population of 40,212 people (2005) already equals the sustainable yield from South Tarawa's current groundwater sources. Plans to extract additional water from other islands in North Tarawa appear problematic because of land ownership and compensation issues. The two-fold problem is to supply people in South Tarawa with adequate quantities of safe reticulated water while developing strategies that encourage decentralisation.

This project is designed to increase the number of households in urban South Tarawa with access to safe, reticulated water supplies and is consistent with UN Millenium Development Goals.

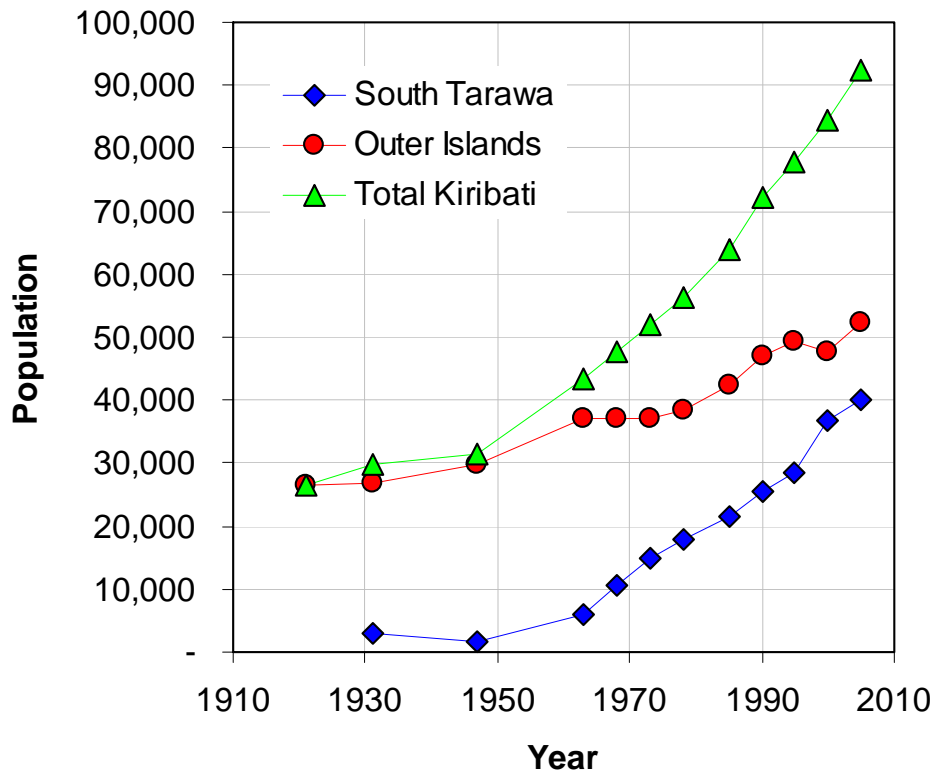


Fig. 3.1 Growth in total Kiribati, Outer Island and urban South Tarawa populations.

3.2 Saltwater Sewerage System in South Tarawa

Following the outbreak of cholera in 1977, the Australian Government funded the Tarawa Sewerage Project. This Project, which ran from 1978 to 1982, provided sewerage services for communities in Betio, Bairiki and Bikenibeu. Because of the limited freshwater supply, reticulated seawater is provided for toilet flushing, and sewerage is macerated by pumps and disposed untreated via ocean outfalls at the three locations. Blockages in the sewers and pumps due to sediments and sand can cause the sewer systems to overflow through manholes, creating an extreme health hazard. Currently blockages are cleared manually, which is a lengthy process, up to a month, and extremely hazardous, involving entry into the sewer mains. A high pressure jetting system would enable blockages to be cleared rapidly and safely.

3.3 Water-Borne Diseases in South Tarawa

South Tarawa has 43.5% of the nation's population in the 2005 census. Health statistics from clinics show that in 2005, South Tarawa had over 55% of the nation's diarrhoea and dysentery cases with just over one in three of the population affected. The crowded island of Betio with 12, 510 people in a land area of 0.8 km² has 31% of South Tarawa's population but had over 54% of its diarrhoea and dysentery cases. Proportionally, the incidence of reported water-borne diseases in crowded urban areas is higher than in rural and Outer Island areas.

3.4 Cost Recovery

The current mechanism for cost recovery for the urban water sector in South Tarawa is through charging for deliveries by tanker of bulk water charged at a rate of \$1/ m³ for domestic and \$10m³ for industry. The marginal cost of water is currently \$3.80/m³ if the costs of leasing the water reserves from traditional landowners are taken into account or \$ 2.55 /m³ if they are set aside.

This proposal plans to install water meters on every household connection and to introduce an Increased Block Tariff in order to recover part of the operation and maintenance costs of the water supply system. The Government has decided that there will be no charge for sewerage services in South Tarawa.

3.5 Relation to the ADB SAPHE Project

The reticulated water supply system for urban South Tarawa was upgraded under the Asian Development Bank Sanitation, Public Health and Environment Improvement, SAPHE, project which was completed in late 2005. The project replaced 24 groundwater infiltration gallery pumps, installed an air sparging system to remove hydrogen sulphide and a main 400 m³ storage tank together with new distribution pumps and a back up generator, replaced the rising main to Teoraereke, built extra five 22 m³ elevated pressure and storage head tanks, constructed 4 new infiltration galleries, extended the pipeline to Temaiku and installed 2229 five hundred litre household tanks. The household tanks were designed to have a trickle feed so that pumping could continue for 24 hours/day. Leakages from the system however have meant that water can only be supplied for 5 or 6 hours every alternate day.

A Loans Scheme for private individuals to install rainwater harvesting and/or sanitation facilities has been operating in South Tarawa based on a revolving fund established under the SAPHE Project. In the years 2002 to 2004, about 710 loans were given for roof rainwater harvesting and storage equipment. Repayments of loans of up to a maximum of \$1,500 are guaranteed by ensuring loans are given only to people with regular incomes and by recovering regular repayments from fortnightly salaries. The scheme is administered by a Loans Manager within the Kiribati Housing Corporation.

The water supply component of the SAPHE project was designed mainly to improve the bulk water supply component of the water supply system. It did not address the leakages that occur in the distribution systems to households nor did it provide adequate pressure header tanks in the new Temaiku extension of the pipeline. To address this two pressure header tanks need to be constructed. Further the SAPHE project did not install water meters on new connections nor did it provide a community education program on the use of the 500L tanks, so that many have now been modified. The Public Utilities Board estimated that in 2004, the total leakage rate was in the order of 50%, mainly from around the local distribution centres. The PUB's goal is to reduce this to 20% by 2009.

In addition to water supply, the SAPHE project rehabilitated 18 pump stations in the salt water flushed sewerage system at Betio, Bairiki and Bikenibeu.

3.6 Relation to KAP II

A number of water related projects have been identified for action under the Kiribati Adaptation Project Phase II, KAP II. Two, *Leakage Detection & Rehabilitation in Betio, Tarawa* and *Consumer Education & Awareness Program for Freshwater* are particularly relevant to this proposed project. The first aims to: (a) plan, manage and conduct a staged program of leakage detection and rehabilitation works within a selected area of the Betio water distribution system; (b) provide training to staff of the PUB Water Engineering Division; and (c) provide recommendations for further work beyond this activity. In essence, it is a necessary precursor to this project.

The second seeks to: (a) design a consumer education and awareness program for freshwater; (b) coordinate awareness activities; (c) prepare awareness materials; (d) design, supervise, conduct and evaluate three consumer surveys throughout the period of KAPII. This has clear relevance to the current proposal.

3.6 Relation to Government Policy

In a statement to the Maneaba ni Maungatabu (Kiribati Parliament), on the opening of its fifth session on October 31, 1994, Te Beretitenti (The President) of the Republic, presented an outline of the Government policy on all areas of its responsibility. Those policies that had direct or indirect implications for the water sector of Kiribati were:

- Strong emphasis is placed on the improvement of living standard of an I-Kiribati.
- Resources and efforts will be directed towards developing subsistence and employment opportunities, and improving living conditions.

The National Development Strategy 2003-2007 includes some policies and goals of direct relevance to this proposed urban water project:

- Raise the quality of life by improving supply and quality of water.
- Ensure sustainable use of water resources,
- Promote community participation for better use of water resources,
- Provide sound infrastructure and services at reasonable costs,
- Rehabilitate and expand existing water supply systems,
- Improve collection, storage, treatment and distribution of water,
- Rehabilitate the sewerage and sanitation system and improve its operation and management,
- Improve maintenance standards for government assets, and
- Ensure that all future construction projects comply with the Environment Act.

The following project is entirely consistent with the above policies and goals.

3.7 Proposed South Tarawa Water Supply Project Brief for Funding under EDF10

Project Title: Improving Access to Safe Water Supplies in South Tarawa.

Objective: To provide safe, potable water to 80% of households on South Tarawa for at least 5-6 hours on every alternate day.

Subproject goals:

1. Provide an extra 1,400 household 500 L trickle tank connections to households on South Tarawa using the new standard house connection design.
2. Install water meters to all connected households to enable water charging on volumetric basis to commence.
3. Develop a three-tiered charging system and customer data base for water.
4. Conduct a consumer education and awareness campaign on operation of the 500 L tanks and on charging for water.
5. Construct of two 22 m³ capacity elevated tanks in Temaiku.
6. Acquire a high pressure jetting machine to clean blockages from sewer pipes and sewerage pump stations.

Tasks: This project will:

1. Liaise with the KAPII technical experts on leak detection in Betio and on consumer education and awareness activities relevant to the refurbishment of household water supplies.
2. Prepare a project plan for the detection of leaks and refurbishment of the urban distribution systems in South Tarawa.
3. With urban Town Councils establish water management committees.
4. With urban water management committees and urban Town Councils, develop strategies for ensuring community ownership, safe operation and maintenance of 500 L household water supply tanks.
5. Implement the refurbishment of urban water distribution systems to households in South Tarawa.
6. Install 1,400 500 L trickle feed household tanks.
7. Install water meters for all household connections.
8. With urban water committees, councils and community groups develop an equitable charging system for water.
9. Design pressure head tanks for Temaiku.
10. Construct, install and test two pressure head tanks for Temaiku pipeline.
11. Form Temaiku Water Management Community with community groups.
12. Acquire a high pressure jetting machine to clean blockages from sewer pipes and sewerage pump stations and provide training for staff in its operation.

Anticipated Outcomes:

The anticipated outcomes from this project are:

- Improved public health in urban South Tarawa due to a decrease in water-borne diseases;
- Equitable access to safe freshwater in 80% of households South Tarawa;
- Decrease in water leakage rates from the reticulation system to around 25%;
- Provision of reticulated water to the Temaiku;
- Establishment of an equitable 3-tiered pricing scheme for water;
- Recovery of a high proportion of the operations and maintenance costs for water supply;
- Improved community knowledge of and participation in local water conservation and management;
- Establishment of urban community water committees;
- Increased speed and safety of cleaning sewer blockages;
- Decreased risk from blocked sewers

Period of Project: 3 years

Institutional Home: Public Utilities Board, Ministry of Public Works and Utilities, Ministry of Finance and Economic Development, and Ministry of Internal and Social Affairs.

Oversight of Project: National Water and Sanitation Coordination Committee

Reporting Period: Annual

Review Period: 1½ years

Estimated Cost of the Project for 3 years: 1.3M €